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MARCH 3, 1964

VOL. 77, NO. 1, PAGES 1-16

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Antibody

A SCIENCE SERIES PUBLICATION

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Kodak reports on:

the question of whether or not instrumentation people really need ultra-fast film ...
the profit viewpoint on nondestructive testing ... a gimmick the committee needn't
resist ... a new gravimetric reagent for potassium

1600—no waiting

How come after all those promises we have made to innumerable instrumentation people over the years that some day there would be 16mm, 35mm, and 70mm film as fast as *Kodak Royal-X Pan Recording Film* now is—Index 1600—how come we now find ourselves in the ridiculous position of being able to make it at a greater rate than they're buying it? How come?

Don't they know that a note or phone call to Eastman Kodak Company, Photo Recording Methods Division, Rochester 4, N. Y., will set up the channel to supply it through a local dealer?

Not too good, not too bad

One lady and 106 gentlemen, all materialists by profession whatever their private spiritual views, have labored long and brought forth two volumes of material philosophy that weigh in about average for newborn babes.

Title: *Nondestructive Testing Handbook*. Editor: Robert C. McMaster, The Ohio State University. Publisher: The Ronald Press Company, New York. Price: \$24. No charge for the applause rendered the work here. What's good for nondestructive testing is good for Kodak.

Nondestructive testing seems to be analytical physics, counterpart to analytical chemistry. The public pictures the "purpose" of chemistry as mostly analyzing things, just as the physicist fashions atom bombs out of cosmic rays. This book shows that physics, too, can have a "purpose" in better, safer, more profitable living. However, the book is not written for the public. Deeply concerned with profit it is indeed.

Too much control of product characteristics squanders resources. Too little squanders reputation. Profit perfumes the happy valley in the middle.

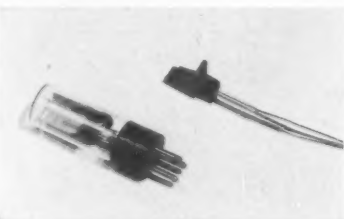
The first section develops these thoughts in a manner to interest and please the management, whether the product is bathtubs or Venus probes. The remaining 53 sections pursue the theme down every crevice of technical detail, not only in our own specialties of film radiography and optical gaging but in such others as liquid penetrants, magnetic particle tests, electrified particle tests, eddy currents, ultrasonics, brittle coatings, photoelastic coatings, strain gaging, radiation sources, fluor-

oscopy and x-ray image devices, x-ray diffraction and fluorescence, and even vision itself, properly aided.

Silicon over the sound track

Quietly, Kodak Pageant Sound Projectors have stolen a march, scored a scoop in their field. You have heard of the "solar battery" which generates useful electrical power when light falls on silicon? The power source for communication from satellites and interplanetary space? Here it is, in over-the-counter civilian hardware, doing a product-improvement job that is apparent even to those who can resist the temptation of a gimmick. If you are on a committee to select a sound movie projector for audio-visual instruction, the facts to lay before your fellow committeemen are these:

Early attempts at sound movies through a variable light pattern on the film employed selenium cells. They floundered. An EMF-generating selenium cell (not to be confused with a device that changes resistance in response to light) has an inherently slow time constant for adequate frequency response. The movies had to wait for the evacuated phototube to give them a good voice.



At left is a phototube such as employed today in most sound projectors. Being a little bulky, light that has passed through the sound track of the film must be somehow transmitted to it. At right is the new silicon "solar" cell. It holds 0.014 square inch of silicon directly above the sound track. It therefore requires a less critical optical arrangement. More important, it generates a varying EMF instead of valving from a constant EMF that must be supplied to it. This considerably simplifies the circuitry. There is less to get out of whack. Also, a solid-state generator happens to generate less random fluctuation than a photocathode system that must be kept under

electrical tension. Less "white noise" shows up at the speaker. The old trouble from inadequate frequency response with selenium is gone.

If the old boys had known enough solid-state physics to place their bets on silicon instead of selenium, people with vivid memories of the silent movie queens would be even older, on the average, than they feel as it is.

We are talking about Kodak Pageant Sound Projectors, Models 8K5, AV-085, and AV-255-S. Your local audio-visual dealer will take it from here.

Made in U. S. A. under hygienic conditions

The Japanese have developed a new gravimetric reagent for potassium which we now offer as *N-(2,4-Dinitro-1-naphthyl)benzenesulfonamide* (Eastman 7828). And regardless of how scarce are good gravimetric reagents for potassium that can be used even in the presence of one-third as much sodium and magnesium as potassium, if that numeral in front of the "naphthyl" in the name had been 2 instead of 1, we would not offer it as Eastman 7828 or Eastman anything else. Our medical director feels so strongly about the carcinogenic properties of β -naphthylamine that it would seem wiser to let the science of chemistry go shift for itself than to observe the safety precautions he demands before he will let it into the plant. Pure α -naphthylamine is OK, as far as we know.

You dissolve the new reagent in lithium chloride solution and use it for the precipitation and conductometric titration of potassium. The precipitated potassium salt of the reagent is washed with the saturated solution of potassium salt and dried at 100°C for an hour. As for the fine details of the procedure, you can either buy 10 grams of Eastman 7828 from us for \$4.45 and work them out for yourself, or you can first read up on them in *Nippon Kagaku Zasshi*, 79, 598 (1958).

We expect no flood of \$4.45 checks for potassium reagent. We merely make the point that some 3800 Eastman Organic Chemicals with a multitude of uses are stocked by Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Price is list and subject to change without notice.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak

TECHNOLOGY

Study Device for Fumes

A device that goes on the breather pipe of the crankcase in automobiles is expected to cut the total amount of hydrocarbons emitted by about 33% to 40%.

A SIMPLE, inexpensive way to reduce air pollution caused by automobiles has been proposed to a House of Representatives health subcommittee, but it has nothing to do with a car's exhaust system.

The device is a pipe that a handy mechanic could make. It goes on the breather pipe of the crankcase. This breather pipe under the hood had been relatively ignored while engineers sought a way to cut down on unburned hydrocarbons in auto exhausts with experimental after-burners and catalytic converters, see also SNL, 76:70 and 76:233, 1959.

But now the breather pipe has been identified as a major emitter of hydrocarbons from gasoline.

The new pipe returns these hydrocarbons to the engine for burning.

A device the Public Health Service has been testing has been estimated to cost \$1.99. Rep. Kenneth Roberts (D-Ala.) and Senator Richard L. Neuberger (D-Ore.) have referred to a model that would cost a dollar or less factory-installed in new cars.

The president of the Automobile Manufacturers Association, L. L. Colbert, has indicated the device would be offered as optional equipment on all 1961 cars. An industry spokesman said the device would cost \$10 installed, not \$1.99.

There are no patent problems because automobile manufacturers have agreed to share all devices to reduce air pollution.

The pipe, however, is only a beginning. It is thought to reduce the total amount of hydrocarbons emitted by an engine by about 33% to 40%. It may have no effect on specific hydrocarbons found in exhaust gases and suspected of producing cancer.

Greater reduction of hydrocarbons—by as much as two-thirds—would result if motorists kept their cars in good running order, a Chrysler Corporation study shows.

Chrysler engineers compared the exhaust gases of 300 Los Angeles cars chosen at random with their own fleet of cars, which receive a complete motor tune-up each 5,000 miles.

(The engineers also found that proper maintenance would improve fuel economy from 15% to 20%.)

As for the status of devices that reduce the amount of hydrocarbons from cars' exhaust pipes, some of these are reported to remove from 80% to 90%. But the cost ranges from \$100 upwards per unit.

Science News Letter, March 5, 1960

GEOLOGY

Lack of Funds Hampers Mohole

THE FINANCIAL prospects for Mohole—the U.S. project to drill deep into the ocean's floor—are rather grim. A direct appropriation by Congress appears out of the question.

Gordon G. Lill, chairman of the American Miscellaneous Society (AMSOC) committee which is running the Mohole project, told SCIENCE SERVICE that Mohole has enough money to stay in business but will need more money for preparatory work this summer.

Noting that Congressional funds were out of the question, Mr. Lill said, "If we get any money for the summer, it will have to come from the National Science Foundation or from private funds." The Federal NSF, however, has hosts of projects clamoring at its doors for aid and may not be able to deal generously with Mohole.

Mohole is a project to drill through the earth's crust to its plastic core. The crust is thinner under the ocean so the work will be done from a ship.

Two areas are being considered. One is near Puerto Rico; the other is off Mexico's Pacific Coast near the Guadalupe and Clipperton Islands.

It has been noted that experts' references to the site speak more and more of the Pacific. A recent scientific publication speaks of when the Mohole "is drilled through the floor of the Pacific" and does not even mention the Atlantic site.

But Mr. Lill says the committee on site selection has not finished its deliberation. Even then, the decision will be debated by project leaders.

The evolutionist Darwin was perhaps the first man to propose ocean drilling. He hoped to find clues to life's earliest forms.

The present Mohole project, however, was proposed by members of the American Miscellaneous Society, a group formed in 1952.

Because American Miscellaneous Society has scientists representing various disciplines, the society is a fine one for a complicated project like Mohole.

Science News Letter, March 5, 1960

BIOLOGY

Blue Haze Is Petroleum From Living Plants

THE BLUE HAZE seen over vegetated areas on a warm summer day is actually petroleum in the process of formation, Dr. Fritz W. Went of the Missouri Botanical Gardens, St. Louis, reports. The haze is caused by a layer of asphaltic and bituminous particles created by hundreds of millions of tons of volatile hydrocarbons and near-hydrocarbons expelled into the atmosphere annually by living plants. These particles, Dr. Went reported in the Proceedings of the National Academy of Sciences, 46: 212, 1960, eventually rain down on the earth and, in time, form petroleum. Dr. Went suggested that the particles influence the weather and serve to regulate plant growth.

Science News Letter, March 5, 1960

TECHNOLOGY

Antibody Molecules Are Photographed

See Front Cover

AN ELECTRON microscope technique has enabled scientists to take pictures of molecules of antibodies, a substance in the blood that fights disease-producing bacteria. The photographs were made through the work of Drs. Alfred Nisonoff and David Pressman, both of Roswell Park Memorial Institute, Buffalo, N. Y., and Dr. C. E. Hall and H. S. Slayter, both of the Massachusetts Institute of Technology. A picture of rabbit antibody, as seen on the cover of this week's SCIENCE NEWS LETTER, was obtained by spraying an antibody solution on a mica surface and then treating the surface with platinum, causing the tiny platinum particles to pile up against the antibody molecules like snowdrifts against a fence.

Science News Letter, March 5, 1960

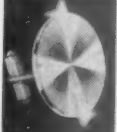


BLACKBURN NA. 39—This British jet plane is making landing trials on the deck of H.M.S. Victorious. It can carry nuclear or conventional weapons. Two de Havilland Gyron Junior jets provide its power.

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MEDICINE

Doctors Need Tranquilizers

IT IS THE DOCTOR who needs those tranquilizers, not the patient.

This was the implication conveyed by several speakers at a seminar in Washington, D. C., on the current uses of tranquilizers, stimulants and related drugs.

Perhaps general practitioners are doling out the calming pills to relieve their own anxieties which develop when they do not know what to do for a patient, Dr. Joel Elkes of the National Institute of Mental Health, Bethesda, Md., suggested at the meeting sponsored by the Medical Society of the District of Columbia.

Tranquilizers can only treat symptoms. They cure nothing, he stressed. Furthermore, they tend to "mask" symptoms that the doctor could find useful in diagnosing the patient's problem.

They abolish hostility, fear, and anxiety which are useful symptoms to the practitioner. The doctor can become frustrated and anxious himself when these symptoms become evident in a patient. It must be kept in mind that abolishing these symptoms does not cure the patient, he said.

Additional criticism came from Dr. Otis R. Farley, director of the medical and surgical branch of St. Elizabeths Hospital, Washington, D. C. He reminded the doctor audience that many of these popular drugs can alter the body's ability to fight infections. Others can cause skin rash, and affect the function of the adrenal glands and entire enzyme system.

Furthermore, there is no specific antidote for many of the tranquilizing drugs. Many of them have proven fatal when given in seemingly small dosages, he cautioned. By the time the physician is aware that the dosage is fatal, he cannot do much because there is no counteracting agent available for many of the drugs.

Doctors should also be aware of the dangers of administering these drugs in

combination with other drugs. Dr. Farley pointed out that not enough is known about combinations of such drugs to justify less than a very cautious approach. He urged that the synergistic action, the action of combinations of drugs, be studied at length.

Questioning the claims and favorable reputation that rapidly developed after tranquilizers were introduced, he reminded doctors that he had seen more people develop bed wetting than he had seen cured of it as a result of treatment with the drugs.

Science News Letter, March 5, 1960

SCIENCE NEWS LETTER

VOL. 77 MARCH 5, 1960 NO. 10

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVIC.

Subscription rates: 1 yr., \$3.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents; more than six months old, 25 cents. No charge for foreign postage.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

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CHEMISTRY

Exotic A-Fuels Seen As Product of Pressure

NEW AND EXOTIC reactor fuels were foreseen as the possible offspring of further research into the effects of high pressures and temperatures on materials.

C. M. Schwartz, Battelle Memorial Institute, Columbus, Ohio, told the American Institute of Chemical Engineers meeting in Atlanta, Ga., that the application of ultra high pressures should become an important tool in promoting changes and reactions in materials.

The resulting materials often would have unusual qualities. Many could be expected to have higher densities, and hardnesses.

As the pressure and temperature capabilities of the research equipment is improved, "there is little doubt that new materials having unique properties will be synthesized," Mr. Schwartz said. The outlook is equally promising in the fields of organic and inorganic chemistry.

Science News Letter, March 5, 1960

ZOOLOGY

Rare Reptile Survives

A REPTILE UNTIL recently believed to be extinct on the New Zealand mainland has been found to exist on the North Auckland peninsula.

The reptile or tuatara is known as the "midget dinosaur" because it is the sole survivor of the order *Rhynchocephalia*, which flourished 200,000,000 years ago.

Closely related to the prehistoric dinosaur, the tuatara combines features of bird and reptile. It has ribs similar to a bird with hook-like attachments known as "uncinate processes," and it has a large bird-like breastbone. Like a crocodile, it has normal chest ribs as well as abdominal ones underneath. The pineal "eye" is another feature that marks the ancestry of the midget dinosaur. The eye, found on top of the head, is overgrown with scales.

Tuatara have been known to exist on the Poor Knights Islands, 11 miles off the east coast of New Zealand. The one found at Tutakaka on the North Auckland peninsula measured 21 inches and weighed two pounds.

Specimens taken from the Poor Knights Islands have been sent overseas to the Zurich Zoo, the California Academy of Science and the Washington National Zoological Park under the direction of the Smithsonian Institution.

Many inquiries and requests have been made to the New Zealand Government for the tuatara, but the requests are seldom granted. The animals are only allowed out of New Zealand for scientific and educational studies at approved institutions.

The tuatara were once plentiful in New Zealand, but were almost destroyed by the rooting habits of pigs introduced to the country.

The survivors, believed extinct in the mainland, have existed on the offshore islands safe from marauding animals. The reptile has been protected for 35 years.

The Austrian naturalist, Andreas Reischek, collected dozens of tuatara to send to Europe in the late 1800's when the Government took no steps to stop the flow of unique natural history treasures being exported from New Zealand.

The tuatara lives on snails, small lizards,

wetas, flies or beetles, which it hunts, while making noises like a frog.

The female tuatara lays eggs, a dozen at a time, in holes scraped out by her forepaws in the burrow. The eggs, an inch long, drab-colored, are covered with soft sand and leaves. When hatched about a year after the laying of the eggs, the youngster hacks through the shell with the sharp-pointed cutter atop his snout.

Thirty tuatara were home-raised at Auckland many years ago. Since then no tuatara had been bred in captivity until 1950 when H. W. Dawbin, zoology lecturer at Wellington University, was successful in hatching two. Later he hatched two more.

Science News Letter, March 5, 1960

TECHNOLOGY

Metal Disk Is Shaped By Underwater Spark

IN A CRACKLE of electricity, a flash of fire and a clap of man-made thunder, a small disk of metal is suddenly "exploded" into a new shape.

The job is done underwater with high precision, Adolph Kastelowitz, director of manufacturing research for Republic Aviation Corporation, Farmingdale, N. Y., reports.

Small sheets of metal 1/16th inch thick already have been shaped experimentally in the laboratory. Researchers now are working on a more powerful experimental version of this electrical metal-shaping device for heavier metal operations.

By charging storage condensers to 20,000 volts, then discharging this power between two underwater electrodes, scientists make a spark that generates a powerful shock wave in the water. The shock wave blasts the metal into the shape of the die upon which it rests.

Mr. Kastelowitz said the system promises to be useful in working some newer steel and titanium alloys that require heavy, complicated equipment to shape them into the close tolerances and aerodynamic smoothness needed.

From the U. S. Naval Ordnance Test

Station at China Lake, Calif., Edward W. LaRocca and John Pearson report they have been able to "explode" powdered titanium into simple metal objects using conventional explosives, rather than electricity.

The powdered titanium is put in a small die. The powder is rammed into a solid piece by a piston. A small explosive charge is used to shove the piston fast and hard into the powdered metal.

The forces appear to be so great that metals can be bonded together by this method when they cannot by normal rolling methods. Also, it appears possible to bond dissimilar materials.

Science News Letter, March 5, 1960

PHARMACOLOGY

Cancer Drugs Derived From Mustard Gas

TWO PROMISING new strategies in the war against cancer have been reported. One is a technique for tailor-making drugs from nitrogen mustard, the crippling war gas used in World War I.

The other is a new screening technique for potential drugs. This technique has been used to find two new drugs that are now ready for clinical tests on human beings.

Dr. William J. Steele, a research associate at the John Harrison Laboratory of Chemistry at the University of Pennsylvania, announced the tailor-making technique at the American Chemical Society's third Delaware Valley Regional meeting at Philadelphia, Pa. The chemist's research indicates the possibility that drugs of the nitrogen mustard type can be designed to attack specific kinds of cancer cells.

The war gas itself has long been used against certain cancers. But it was not thought that modifications of the molecular structure of the gas would radically change its action.

Dr. Steele found they did have different actions. He tested modified drugs on DNA, an acid in body cells that influences their growth.

Dr. Robert J. Rutman, senior research associate at the same lab as Dr. Steele, announced his new screening test. Instead of comparing animal tumors treated with a new drug against untreated tumors, he compares the tumors treated with the new drug against tumors treated by the standard drug now in use by doctors. This eliminates drugs that are helpful but not as good as present drugs.

Dr. Rutman compares an old and a new drug on many kinds of tumors in several kinds of animals. The different animals are used because no single animal has quite the characteristics of man.

Dr. Rutman said the new drugs found by the tests are both chemically related to nitrogen mustard.

Dr. Roger P. Staiger, associate professor of chemistry at Ursinus College in Collegeville, Pa., told at the meeting of a four-week experimental course in chemistry. He said it demonstrated that high school students could readily grasp college-level chemistry concepts.

Science News Letter, March 5, 1960



MIDGET DINOSAUR—A tuatara, a reptile until recently thought to be extinct, is in the process of eating a New Zealand native insect, a weta. These tuatara are the first ever raised in captivity.

ROENTGENOLOGY

Heart X-Rays Improved

X-RAY photographs of the heart and great blood vessels can now be taken at the fantastic rate of 50 frames a second.

This increase over the standard six to 12 frames a second is due largely to what Dr. Tsung O. Cheng of the Brooklyn Hospital calls a cine attachment.

The process of taking X-ray photographs of the heart and major blood vessels after injection of a radio-opaque dye is called angiocardiology. It is an exacting procedure which has had a number of drawbacks.

For instance, angiocardiology was formerly performed by injecting dye into a vein and waiting for it to reach the heart. However, by that time, it was diluted to such an extent that it gave only a hazy image.

The next method tried was to inject dye through a catheter (narrow tube) lying in a chamber of the heart. Even then, as the dye flowed out of the catheter rather slowly, it was diluted by the blood and diffused so rapidly throughout the heart that again a clear picture was extremely difficult to obtain.

With a mechanical rapid dye injector, the full charge of concentrated dye is shot out of the catheter within one to two seconds, giving a sharp contrast which is photographed as it courses through the heart.

The cine attachment itself is a conventional X-ray tube and fluoroscopic screen, placed below and above the patient on the treatment table. It has, in addition, a five-inch image-intensifier tube above the screen. This greatly strengthens the image, and permits motion pictures to be taken with only a fraction of the amount of X-rays ordinarily required. A motion-picture camera is located at the top of the tube and its shutter operates only when the X-ray current is on.

The heart action of very young cardiac patients can exceed 150 beats per minute. Thus the dye may outline a defect during the fraction of a second which falls between the six to 12 frames, and be missed. With the cine attachment, as many as 50 frames a second can be taken and defects missed on the conventional angiocardiology have been picked up with this method.

Science News Letter, March 5, 1960

PUBLIC HEALTH

Talk About Birth Control

SOME OF THE SAME wives who will freely discuss their own use of birth control methods regard questions about income as "too personal."

During a study of family growth, only 10 women out of 2,713 would not answer questions about their attempts to avoid conception. Others gave the trained women interviewers complete information on pregnancy histories, family limitation practices and future plans.

"For many of these women," said population expert Pascal K. Whelpton of Miami University, Oxford, Ohio, "this was the first time that a respectable person had made sex a decent topic of conversation."

The study showed that 79% of the couples had already used or intended to use contraception. The investigators defined contraception as any method to avoid conception, except sterilization and celibacy. Rhythm was the third most frequently used method, preceded in popularity by two artificial devices used by husband or by wife.

The investigators said that "most of the couples were neither very careless nor very strict in their family planning practices."

The majority (68%) had not planned all of their pregnancies, but wanted all they had, and expected that nature or contraception would keep them from having too many in all.

At the extremes were those who had completely planned the number and spacing of children (19%), and those who had "planned so poorly" that they had more children than they wanted (13%).

Of all Catholic wives interviewed, including those who could not have children, 70% conformed to church doctrine by using no method at all (43%) or by using only church-approved rhythm or abstinence methods (27%).

Eighty percent of the Catholic couples who could have children used or intended to use contraception. Comparable figures were 94% for Protestants and 96% for members of the Jewish faith.

Among the couples who would never use contraception, nearly three-fourths showed some evidence of impairments to the reproductive system. These "fecundity impairments," rather than choice, are the major cause of childlessness.

The study also showed that ten percent of the couples were sterile. In most of these cases either husband or wife had had an operation that made childbearing impossible.

Usually the operation was for the removal of a tumor or other health reasons, but sometimes it was because of excessive childbearing in past years.

Another 24% of the couples had impairments that greatly reduced the probability of conception.

Nearly 13 out of every 100 pregnancies resulted in fetal death by stillbirth or miscarriage, and one wife in every five could expect such an occurrence sometime during her childbearing history.

The women interviewed were white, American wives from all economic and social groups between 18 and 39 years of age.

Findings of the study are contained in "Family Planning, Sterility, and Population Growth," by Dr. Ronald Freedman of the Survey Research Center, University of Michigan, Prof. Arthur A. Campbell of the Scripps Foundation for Research in Population Problems, Miami University, and Prof. Whelpton.

Science News Letter, March 5, 1960

BIOLOGY

Spontaneous Life Theory Advanced by Biologist

THE THEORY that new life may originate spontaneously from organic matter, popularly believed to have been disproved 100 years ago, has been advanced by a biologist at Rutgers University.

He claims that the chemical basis for the establishment of life in the first place continues to exist, making possible the origin of similar but not necessarily identical primitive organisms throughout biological time.

This theory disputes the current theory of evolution that holds that life originated from only one case of spontaneous generation and that all subsequent forms of living things have evolved from that single case.

Dr. John Keosian, director of natural sciences, Newark Colleges of Rutgers University, reports in *Science*, 131:479, 1960, that it would be more plausible to accept present-day viruses as units of recent and present origin than to suppose they have descended through some two billion years relatively unchanged.

"Throughout time," he reports, "viruses either evolved into higher organisms or were eliminated in the process of evolution, being ever re-established through neobiogenesis."

Opponents of recurring biogenesis argue that it would take too long a time and that new forms of life would be unable to compete with existing organisms.

Dr. Keosian claims biogenesis need not take more than a "relatively short time" because there is now an even more complex organic milieu than was present in the sterile environment that existed before the origin of organisms.

He also asserts that it should not be assumed that an organism, simply because it is newly arisen, would have no adaptive features to cope with competition. Also, organisms with incomplete metabolisms may arise and survive by becoming parasites on existing organisms having complementing metabolisms.

Suggestions that neobiogenesis "may be expected to establish exotic forms of life different from the form of life as we know it may have a place only in science fiction," he states.

Louis Pasteur successfully demolished the contention of those who claimed to have demonstrated "spontaneous generation," Dr. Keosian says, but did not disprove the possibility of neobiogenesis of the most primitive microorganisms.

Science News Letter, March 5, 1960

AERONAUTICS

Jetting to 50th State

TIME IS NOT the prime necessity to get about the world fast these jet-transport days. It is money, and actually not too much of that.

One can go from Honolulu to Chicago in less than the standard eight-hour working day, actually 7 hours and 52 minutes non-stop, as a party of newsmen did on Washington's Birthday aboard one of United Airlines' new DC-8 jet transports with J-75 engines. This is the same kind of jet mainliner that United will use to begin regular passenger service between San Francisco and Los Angeles and Honolulu on March 14.

The Honolulu-Chicago record will probably not be equaled or exceeded soon because it probably will not be a regular run. A stop on the West Coast will increase the time of the journey only about an hour or less and give the opportunity to carry intermediate passengers.

The scheduled time westward from San Francisco by jet to Honolulu is 5 hours and 15 minutes, which is not too much more than the 4 hours and 26 minutes taken by the lilyingly expressed "DC-8 to the 50th State" flight three days earlier. The regularly scheduled eastward flight will be faster, due to the favorable winds, a matter of 4½ hours, and then five hours more to New York.

On the press flight, even with the refueling at Chicago and the change to a regular propeller-driven DC-7B at Idlewild, I arrived at Washington only 12½ hours after leaving a gala Honolulu evening that ended at 4 a.m. (that is expressed in Eastern Standard Time, I hasten to add.) Actual flight time on forthcoming regular schedules is 11 hours and 20 minutes.

With jets coming of age in the Pacific after more than a year of crossing the Atlantic and trail-blazing in other parts of the world, jetting to more distant lands is in the offing. They are reaching out into the Far East, chopping days off travel time formerly necessary. They will bring such romantic sounding spots as Tahiti, a thousand miles from Honolulu, into jet-reach, although before that happens an airfield must be built there. A thousand miles is only about two hours in the DC-8, traveling at the 550 miles per hour that was averaged on the 4,313-mile Honolulu-Chicago press flight.

Dollars? It depends on how you go. From San Francisco to Honolulu, about \$150 to \$200 will take you there, coach and first class, give or take a few dollars. The one-way fare is estimated because you may wish to stay there.

W.D.

Science News Letter, March 5, 1960

MEDICINE

Woman Herself Is Best Guinea Pig for Test

THE WOMAN herself is the best "guinea pig" to use to determine whether or not she is pregnant.

Female hormone tablets will produce more accurate results than the rabbit, frog or mother animal tests that have been used for the past 25 years, Dr. Harold A. Schwartz of Chattanooga, Tenn., told members of the Indiana Academy of General

Practice at Fort Wayne, Ind. Furthermore, the vice president of the Tennessee Obstetrical and Gynecological Society added, the hormone test eliminates the need for laboratory work.

The test is based on a natural hormone reaction of the human body. The basic element of the test is progesterone, the female hormone which has the function of preparing the lining of the womb to receive and nurture the fertilized ovum.

When a woman misses her period and has reason to believe she is pregnant, progesterone is given to her for three days, then withdrawn, Dr. Schwartz explained.

If she is pregnant, the hormone will help implant the ovum properly, while the patient is completely unaware of any change.

On the other hand, if she is not pregnant, menstrual bleeding begins a few days after the last dose of hormone. In such cases the woman has been the victim of amenorrhea, or missed periods.

Experimentation with the various methods of administering progesterone, including by injection and tablet, plus in combination with other hormones, has led Dr. Schwartz to this conclusion:

Tablets will answer the question of pregnancy quicker than other forms. The tablets he used on 220 patients were called Pro-Duosterone.

He warned colleagues not to expect an accurate result in women who have had a history of irregular periods of three months duration or longer.

Science News Letter, March 5, 1960

PUBLIC HEALTH

Report on Radiation Dose Urges Conservatism

THERE IS NOT enough evidence to show that radiation can produce bodily harm at low levels, so an Ad Hoc Committee of the National Committee on Radiation Protection and Measurements "has chosen to make the cautious assumption" that there is a proportional relation between dose and effect, and that the effect is independent of the dose rate.

With this as a starting point, the Committee publishes its conclusions in *Science*, 131:482, 1960. They include:

1. Even the smallest dose is associated with some risk, and exposure of the general population to any increase in radiation should not occur unless benefits are expected.

2. The establishment of permissible doses of man-made radiation should be based on the average natural background radiation level.

3. For sources such as radioactive strontium and iodine, which tend to concentrate in certain body organs or tissues, the maximum permissible dose should be established in terms of the tissue or organ expected to receive the most radiation.

4. Maximum permissible doses must be set for food, water and air so that the average person will not receive more than the permissible dose when all sources are combined.

Science News Letter, March 5, 1960



FLIGHT TO HAWAII—Powered by four Pratt and Whitney J-75 engines, a United Air Lines DC-8 Jet Mainliner speeds toward Hawaii. On March 14 jet service will be introduced between the Hawaiian Islands and California. The eastward flight will take only four and a half hours.

ARCHAEOLOGY

Experts Eager to Keep Dead Egyptian's Feet Dry

THE TWO ASWAN DAMS, long a political issue, are now a major archaeological one.

Water backing up behind the dams, which are being built with money from the USSR, will ruin two ancient treasures by September, 1963, experts predict.

So UNESCO experts propose to save one wonder, the great temple of Rameses II, by building another dam out from the west bank of the Nile. The other archaeological area, the island of Philae, will be protected by still another dam, if funds are available.

UNESCO has launched an international campaign for the needed funds.

The Nubian valley where the Aswan dam is located is only a desert, but it contains some of the grandest monumental and architectural efforts of ancient Egypt.

Rameses II was a fanatic temple builder and one of the great pharaohs of the New Kingdom in the 13th century B.C. He had a huge temple hewn out of the mountain-side at Abu Simbel to glorify his name for all time.

On the island of Philae the strange cult of Isis, goddess of fertility, once flourished. The big temple still shows much of its original grandeur and beauty. To save this area, an artificial lake can be created by building another dam with its ends resting on neighboring islands and on the bank of the Nile.

Plans have been made to remove other temples and monuments that will be flooded by the rise of the Nile.

UNESCO's appeal asks governments, public and private institutions, and all interested persons for help to the United Arab Republic and the Sudan in this enormous archaeological rescue mission. In return for salvage action, at least half the treasures removed by excavations carried out in the threatened area has been offered to the participants.

Science News Letter, March 5, 1960

ARCHAEOLOGY

U. S. Expedition to Probe Herod's Sunken Harbor

KING HEROD'S sunken harbor and the ancient sea routes used by King Solomon will be explored this year.

A marine archaeological expedition will probe the coastal waters of Israel this spring and summer to attempt recovery of old objects from the sea bottom. It is hoped that such objects may shed new light on the early history of sea routes used by the Phoenicians, King Solomon, Roman and Greek galleys and, in more recent times, the ships of the Crusaders.

A main point of exploration will be the sunken harbor of Caesarea, in early Christian times the leading city of Palestine and the favorite of King Herod the Great, from which St. Paul sailed on his journey to Rome.

In preparation for nearly three years, the expedition will be sponsored jointly by

the American-Israel Society in Washington, D. C., and Princeton Theological Seminary, Princeton, N. J. Its leader will be Edwin A. Link, an inventor and explorer.

Mr. Link will use his newly constructed, especially equipped vessel Sea Diver in the undertaking. It is 91 feet long, diesel powered, and will set out on the 6,000-mile crossing from Miami to Israel early in April.

The venture is claimed to be the first in which a vessel especially built from the keel up for underwater exploration will have undertaken a search for objects of antiquity.

The American-Israel Society was founded in 1954 as a non-political, educational organization dedicated to advancement of understanding between the United States and Israel by exchange of cultural information. It is composed of persons of all faiths.

The Princeton Theological Seminary is a Presbyterian institution and one of the oldest centers of religious instruction in the United States.

Science News Letter, March 5, 1960

PHYSIOLOGY

Electromagnetism May Be Used for Brain Studies

ELECTROMAGNETISM may be used to stimulate the conscious human brain, produce mental, emotional and hormonal responses, and to stimulate nerves, muscles and other irritable tissues.

This possibility is suggested in recent experiments by Dr. Alexander Kolin and Dr. Norman Q. Brill, assisted by Paul Broberg, of the University of California Medical School at Los Angeles.

Such a technique might be a valuable tool in exploration of the central nervous system, they said.

The UCLA research team has been able to stimulate frog nerves and excised frog muscles by placing them in an alternating magnetic field. The muscles contracted just as if they were connected to stimulating electrodes. The effect was due to eddy currents induced in conductive tissues and their surroundings, Dr. Kolin said.

The investigators were also able to induce visual and other sensory effects in human subjects by electromagnetic fields adjacent to the skull.

Locating brain areas which control different types of behavior has been largely accomplished by applying electrodes to various brain areas and stimulating them, Dr. Kolin points out.

Such a technique is obviously limited in humans, being practical only when the skull is opened for surgery and the patient is under influence of drugs.

The use of electromagnetically-induced eddy currents to stimulate or inhibit limited brain areas, if practical, could be done without surgery in a conscious subject, the investigators pointed out.

Such a technique would greatly facilitate exploration of how the brain controls human behavior.

Science News Letter, March 5, 1960

IN SCIENCE

METEOROLOGY

Los Angeles Has Two Sea Breezes

FLORIDA has a sea breeze, but Los Angeles has two, a scientist has found from a detailed examination of the daily variation of the Santa Monica winds.

Prof. James Edinger of the University of California at Los Angeles said one of the two sea breezes comes from the west-southwest, below the much-publicized temperature inversion, and the other above from the south. His report was made at the American Geophysical Union meeting at the University of Southern California in Los Angeles, Calif.

Prof. Edinger suggested that the direction of the upper flow is due to the east-west orientation of the San Gabriel Mountains, which rise above the inversion and there play the role of a coastline heated by the sun. (A sea breeze along a coastline normally occurs as cool sea air moves onshore when the land becomes sufficiently heated by the sun during a summer day.)

His analysis was confirmed by a mathematical study of the problem by Dr. S. K. Kao, also of UCLA, who found that the temperature inversion acts as a boundary separating the two circulations.

Science News Letter, March 5, 1960

NAVIGATION

Turn Signals Tested For Warning Ships

THE MILITARY Sea Transportation Service is experimenting with turn signals for ships. They are being tried on the Golden Eagle, a ship operating from Norfolk, Va., to Bremerhaven, Germany.

Conventional whistle signals are often drowned out by engine noise and other ship sounds, and bridge watches have come to rely on the visual signal of steam from the whistle as a precautionary measure.

The arrow signals may provide a reliable supplement to the sound. When another ship is attracted by the whistle, it can double-check on the signal by noting which direction the arrows are pointing.

The Golden Eagle's arrows are attached horizontally across the railing on the forward side of the flying bridge, where they are visible to ships forward of the Eagle. The arrows are pointed at both ends, with the appropriate point designed to light and indicate the ship's movements to port or starboard.

Capt. A. Vreugdenhil of Holland invented the signals, which were first installed on the Dutch cross-channel ship Batavier V.

Visible for two to three miles in normal conditions, the arrows are composed of 28 100-watt bulbs enclosed in amber globes.

Science News Letter, March 5, 1960

SCIENCE FIELDS

PSYCHIATRY

Mental Care Improves But Still Inadequate

STATE- AND county-operated mental hospitals, which care for 85% of the nation's mental patients, offered better care in 1958 than they did in previous years despite a slight budget cut.

These hospitals spent nearly a dollar a day more on each patient in 1958 than in 1957.

The number of physicians in these institutions also increased, but the total number in 1958 was still only 57% of the number needed. Staff employees rose from 27 per 100 patients in 1956 to 31 per 100 patients in 1958.

Lawrence J. Linck, executive vice president of the National Association for Mental Health in New York, reported that the Association's findings are good but warned against too much optimism. Mr. Linck said there is still only about one doctor where two are needed, and that almost half of the patients are not even getting minimum psychiatric care. He stated further that the \$4.06 now being spent daily on each patient is only a little more than a third of what the Veterans Administration mental hospitals spend, and one-seventh of what is spent in general hospitals.

The average state government spends a little over three percent of its total budget on maintenance of mental hospitals. State and local governments, considered together, spend less, than two percent, and this has to stretch to cover 650,000 mental patients in all states, the Association's report showed.

Science News Letter, March 5, 1960

PUBLIC SAFETY

Drivers "Tense Up" On Unpredictable Road

DRIVERS tend to "tense up" on roads that keep them guessing as to what the next hazard will be.

This could be a busy artery through a city at rush hour, or an area along a wide highway congested with shopping center traffic.

Tests were run on ten drivers who were "wired" for measuring galvanic skin reflex associated with tenseness. Results showed tension in drivers mounts as hazards become more difficult to predict, and as traffic complexity increases.

Richard M. Michaels of the U. S. Bureau of Public Roads told the Highway Research Board meeting in Washington, D. C., that the tests were conducted during five time periods, including peak and off-peak traffic hours, and at night. The tests were conducted on two urban streets.

During the tests, "traffic events" requiring action occurred at the rate of one every

21 to 35 seconds. The movement of other vehicles accounted for 60% of these "events."

Robert V. Rainey, John C. Conger and Charles R. Walsmith of the University of Colorado School of Medicine reported "significant differences" were found between high school sophomores electing to take driver education courses and those who did not study driving.

The 15½-year-old boys who elected to take driver education courses tended to be less active, more deliberate and restrained, and less prone to rapid and hurried action. They appeared less concerned with dominating others and with being conspicuous. They were more likely to be "serious and subdued." Socially, these boys also tended to be more shy and less spontaneous in social gatherings.

The researchers pointed out that driver education classes thus appeared to be composed of "a selected group" and this must be taken into consideration when weighing the merits of high school driver courses in teaching safety.

Science News Letter, March 5, 1960

MEDICINE

TB Vaccine Stimulates Mouse Tumor Recovery

THE VACCINE that has stimulated resistance against tuberculosis appears to be doing the same job with implanted tumors in laboratory mice.

This is one of the scientific advances appearing in the two-year report of the Sloan-Kettering Institute for Cancer Research, New York. The report was made public by Dr. Warren Weaver, chairman of the board of trustees, and Frank A. Howard, president.

Scientists at the Institute have found that the body's natural defenses can be stimulated to recover 100% from one form of cancer, sarcoma 180, in laboratory mice. The most effective agent for this stimulation has been BCG, bacillus calmette guerin, which has been commonly used to stimulate resistance in children exposed to tuberculosis.

Studies of animals with spontaneous rather than implanted cancers are now in progress to discover whether or not these, too, have the profound effect on the defense system and if stimulation of the defenses can slow or stop their growth.

Another advance marking two years of scientific progress at the Institute involves a study of possible hazards from X-ray procedures. It was found that a one-degree misalignment of a conventional X-ray cone during chest X-ray can increase three-fold the dose to the ovaries. Furthermore, failure to adjust the machine to a short man can increase the dosage to the scrotum by 60.

The report opened with a memorial statement honoring the late Dr. C. P. Rhoads, director of the Institute since its founding in 1945. He died on Aug. 13, 1959.

Science News Letter, March 5, 1960

GENERAL SCIENCE

New Chemistry Course Presentation Described

SEVERAL ATTEMPTS are at present being made to improve the presentation and content of scientific courses both in the high school and university. Many of these new courses are being sponsored by the National Science Foundation.

The new introductory course in high school chemistry prepared by the Chemical Bonds Approach Committee is perhaps one of the most important innovations in the teaching of chemistry in many years. The C.B.A.C. course is, as its name implies, based upon the observation that it is the chemical bond that distinguishes chemistry from related fields. The course, complete with laboratory manuals for both students and teacher, is already completed in draft form, and is at present on trial at nine high schools in different parts of the U.S.

The most complete description of the C.B.A.C. course to date is presented in this month's (February) edition of Chemistry. Included are three lengthy extracts from the yet unpublished trial edition of the text in which the various bond types are discussed in detail with the aid of many diagrams and plates. Effectively, this article is a valuable chemistry lesson in itself.

Copies of the February issue of CHEMISTRY may be obtained from SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., at 50¢ a copy, or 35¢ a copy for orders of ten or more copies. This important issue is being offered as a bonus to those sending a year's subscription to CHEMISTRY, at \$4.00 (eight issues, September through April).

Science News Letter, March 5, 1960

PSYCHOLOGY

Mental Attitude Affects Tendency to Overeat

EMOTIONAL depression disturbs the normal balance of sugar metabolism in the body, and this, in turn, caused some obese women to overeat.

The overeating is not caused by an increase in hunger drive, but by a failure of the brain's signal mechanism to indicate when hunger had been satisfied, Dr. Albert Stunkard, professor of psychiatry at the University of Pennsylvania, reports. The upset in sugar metabolism seemed to interfere with proper stimulation of the brain's mechanism for indicating hunger satisfaction.

Research by the investigators indicates that mental attitudes and reactions play an important role in accelerating or retarding a person's inclination to become excessively overweight.

Assisting Dr. Stunkard are Drs. Anna Marie Chirico and Myer Mendelson, and Charles R. Koch and Mrs. Barbara Martin. The team received a \$140,000 grant from the National Institute of Mental Health, Bethesda, Md.

Science News Letter, March 5, 1960

GEOLOGY

Icebergs Still Menace Ships

Treacherous masses of glacier ice enter the foggy Grand Banks area off Newfoundland. The International Ice Patrol maintains a season-long surveillance of these icebergs.

By RICHARD LITELL

MASSIVE ICEBERGS calved from Arctic glaciers begin to move southward in early spring into the world's busiest shipping lane off Newfoundland's Grand Banks.

This year, as always before, they remain a natural hazard that man, with all his ingenuity, cannot completely control.

In an average year, about 400 bergs drift below the 48th parallel and into the steamer lanes. Occasionally only a few appear but, sometimes they will come in swarms of over 1,000. Last year (1959) was a comparatively heavy season with 693.

Present indications point to a rather light season this year, although it is impossible to predict exactly what each season will bring.

The average iceberg that reaches or passes Newfoundland has a volume of 5,000,000 cubic feet and weighs 150,000 tons. The same iceberg in its Arctic birthplace, however, was ten times as big with a volume of 50,000,000 cubic feet and a weight of 1,500,000 tons.

Thus the icebergs that drift below the 48th parallel and constitute a danger to shipping are bergs in the twilight of life—two to three years old. Though treacherous and able to inflict mortal wounds in the hardest of ships, these bergs' days are numbered. The warm waters of the Gulf Stream usually melt them down in a week to ten days.

Iceberg Life Cycle

The start of this life cycle—from bergs ten times the size of the Empire State Building to harmless ice cubes—takes place in the glacier capped barrens of the Arctic. They are born where glaciers meet the sea.

A few originate in Spitzbergen or other Arctic islands, but by far the majority of the 20,000 icebergs born each year come from the west coast of Greenland. A frozen blanket of ice over a mile deep and more than 1,000,000 square miles in area, covers Greenland. There are about 100 tidewater glaciers along its west coast, but only about 20 of these combine to make icebergs Greenland's largest export.

Glaciers give birth to bergs in either of two ways. Where there is a sharp drop from the shore to the sea floor, water eats away at the base of the advancing glacier until the overhang breaks off and falls into the sea with a roar.

The bergs may also be calved, or floated off, where the sea floor slopes gradually from the shore and the advancing glacier pushes down into the sea. When deep water is reached, the buoyancy of the ice lifts the foot of the glacier and snaps it off.

Once born, these huge mountains of ice begin a roundabout, 1,800-mile two- to three-year journey to the Grand Banks area, a trip that few of them are able to complete. Their travels, at the rate of about 10 miles per day, are largely dictated by winds and currents, with the latter playing by far the bigger role.

The icebergs are swept northward by the West Greenland Current, then westward across Baffin Bay, and then southward along the Labrador coast by the Labrador Current.

Bergs calved from west Greenland glaciers one summer usually spend their first winter in the vicinity of Melville Bay in northern Greenland, their second winter in the neighborhood of Cape Dier on Baffin Island, and reach the Grand Banks during the following spring and summer.

Of the 20,000 bergs that set out, thousands are grounded in Greenland bays or are trapped by Arctic islands. Many others pile up on the northern Newfoundland shore. Those that make it to the Grand Banks are greatly reduced in size, yet still hazardous.

Icebergs, 85% of their bulk being hidden underwater, would be dangerous anywhere they are encountered. They are especially dangerous around the Grand Banks where Arctic and tropical waters meet to exhibit

the greatest hydrographical contrasts to be found anywhere in the world.

The area's frequent thick fog makes navigation through iceberg infested waters extremely precarious, and hampers aerial tracking. To make matters worse, radar detection, never completely effective for spotting icebergs because sea water is a better reflector of radar waves than ice, is especially impractical here. The existence of many layers of air with sharply varying temperatures causes radar waves to be bent upward.

When the difficulty arising from the prevalence of fog is added to the concentration of merchant ship and fishing vessel traffic in the Grand Banks area, the importance of being ever alert to the exact location of icebergs is easier understood.

Not only is the Grand Banks area the world's heaviest seaborne traffic lane, it is also probably the world's busiest fishing area.

One has only to recall the Titanic disaster in April 1912, in which that proud "unsinkable" ship together with 1,513 of her passengers and crew were lost after ramming an iceberg's invisible underwater shelf, to know what terrible damage an iceberg can do.

This tragic sinking spurred the creation of the International Ice Patrol in 1914. The Patrol, run by the U. S. Coast Guard and maintained throughout the ice season from February through August, covers a region of the Grand Banks about the size of the State of Pennsylvania.

Sixteen nations contribute toward its up-



DANGEROUS ICE—Seen through the boat falls of the U. S. Coast Guard Cutter *Androscoogin*, a Coast Guard R5D ice reconnaissance plane flies over a Grand Banks iceberg off Newfoundland.

keep—Belgium, Canada, Denmark, France, Greece, Italy, Netherlands, Norway, Sweden, the United Kingdom, the United States, Spain, West Germany, Liberia, Panama and Japan.

It is to the Ice Patrol's credit that no fatalities as a result of iceberg collisions have occurred in its area of responsibility since its inception.

Besides the regular work of locating icebergs and warning passing vessels of the danger limits, the Patrol employs the latest oceanographic techniques for the prediction of iceberg drift and deterioration.

The Patrol has three planes based at Argentina, Newfoundland, for aerial observation. Known as R5D's, these are actually specially configured DC-4's with observation platforms.

In addition to the planes, the Patrol has one oceanographic ship that is always on duty, and two cutters that are now on standby for use when poor visibility makes flying impossible or during periods of heavy iceberg saturation.

The Patrol collects ice, weather and sea temperature reports from shipping and aircraft traversing the Ice Patrol area, evaluates all ice information in the light of meteorologic and oceanographic conditions, and radios the ice situation twice daily to all shipping in the Grand Banks area.

Since 1914, except for intervals in World Wars I and II, the Patrol has been continuously maintained by the Coast Guard, and an average of 397 bergs have been observed to pass below the 48th parallel each year.

The heaviest season was in 1929 when there were 1,315. The lightest season was in 1958 when none was reported during the season but one after the season. The next year, 1959, was again a heavy year with 693.

This year, according to Lt. Cmdr. Robertson P. Dinsmore, the Patrol's ice information officer at Woods Hole, Mass., the extremely light field ice conditions off Labrador would seem to point to a rather light season.

Field ice, small chunks of frozen sea water, and icebergs have different origins. Yet their respective abundance is related because field ice tends to keep the ocean calm so that the iceberg's biggest enemy—heavy waves—cannot erode them.

Iceberg destruction has also been attempted by the Patrol. It never tries to melt a berg, however, but merely break it up so that it may melt quicker in the water. Cmdr. Dinsmore says it would take the heat given off by 2,000,000 gallons of burning gasoline to melt an average size berg, even at an unattainable 100% efficiency.

In the past, destruction techniques such as gunfire, land mines, torpedoes and plain thermite bombs have proved unsuccessful.

This year, the Patrol hopes to devise a thermite-containing armor-piercing bomb as well as an effective way of hitting a berg with such a bomb. Boarding a floating iceberg that has reached the Grand Banks area is very hazardous because the berg turns over several times a day.

Science News Letter, March 5, 1960

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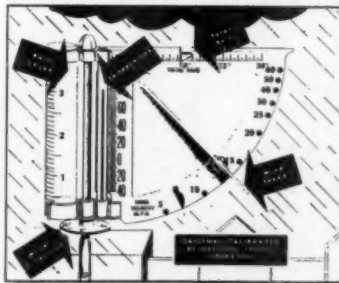
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ASTRONOMY

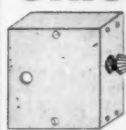
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THE ADVENTURE BOOK OF UNDERWATER LIFE—Carleton Ray—*Capitol Pub. (Golden Press)*, 96 p., illus., with kit, \$2.95. Kit contains brine shrimp eggs, and equipment and instructions for breeding them.

AMERICAN TEACHING ABOUT RUSSIA—Cyril E. Black and John M. Thompson, Eds.—*Ind. Univ. Press*, 189 p., \$4.50. Examines the status of Russian studies in U. S. graduate, undergraduate and secondary schools.

THE ANTECEDENTS OF MAN: An Introduction to the Evolution of the Primates—W. E. Le Gros Clark—*Quadrangle Bks.*, 374 p., illus., \$6. Systematic examination of the development of the major anatomical systems of the primate order and its subdivisions.

ASSESSMENT OF HUMAN MOTIVES—Gordon W. Allport and others, Gardner Lindzey, Ed.—*Grove*, 273 p., paper, \$1.95. Reprint, first published in 1958.

THE BIOLOGY OF MYCORRHIZA—J. L. Harley—*Interscience*, 233 p., illus., \$8.75. For biologists, presents critical review of the experimental evidence of the ways in which mycorrhizal organs function.

CAREERS FOR WOMEN IN THE PHYSICAL SCIENCES—Women's Bureau—*GPO*, 77 p., illus., paper, 35¢. Reviews the kind of work women are doing in chemistry, physics, geology, astronomy and meteorology.

CHEMISTRY FOR OUR TIMES—Elbert C. Weaver and Laurence S. Foster—*McGraw*, 3rd ed., 666 p., illus., \$5.72. Elementary chemistry using inductive approach, with emphasis on principles.

COMPUTERS AND HOW THEY WORK—James D. Fahnstock—*Ziff-Davis*, 228 p., illus., \$4.95. Describes the principles behind electronic calculating machines, their manufacture and operation.

ELEMENTS OF CARTOGRAPHY—Arthur H. Robinson—*Wiley*, 2nd ed., 343 p., illus., \$8.75. On the planning, designing and construction of maps as media for communication or research.

FLAGS OF THE U.S.A.—David Eggenberger—*Crowell*, 206 p., illus., \$4.50. Step-by-step historical development of the American flag.

A GUIDE TO THE PLANETS—Patrick Moore—*Norton*, rev. ed., 254 p., illus., \$6.50. Has chapter suggesting useful work for the amateur.

HANDBOOK OF ELECTROCHEMICAL CONSTANTS—Roger Parsons—*Academic*, 110 p., \$6. Pocket-size reference work.

INFECTIOUS DISEASES OF ANIMALS: Diseases Due to Bacteria, Vol. 1 and 2—A. W. Stableforth and I. A. Galloway, Eds.—*Academic*, 810 p., illus., \$33 per set; \$18 each. Reference work for researchers and post-graduate students in veterinary field and in public health.

INTERNATIONAL AUTOMOBILE PARADE 1960,—Arthur Logos, Ed.—*Chilton Co.*, 3rd ed., 308 p., illus., \$10. First American edition of survey of European and American new models, with complete list of data on each.

INTERNATIONAL DEVELOPMENT REVIEW, Vol. I, No. 1—Gove Hambridge, Ed.—*Soc. for International Development*, 64 p., illus., paper, quarterly, subscription included in membership, \$10 annually. Articles and information about organization of and experience with technical assistance to underdeveloped countries.

KNOW YOUR WOODS—Albert Constantine, Jr.—*Home Craftsman*, 384 p., illus., \$5.75. Helps identify trees, woods and veneers, and gives their principal uses.

LANGUAGE CHANGE AND LINGUISTIC RECONSTRUCTION—Henry M. Hoenigswald—*Univ. of Chicago Press*, 168 p., \$5. Monograph on procedures which lead to the recovery of lost language structures.

THE LORE AND LANGUAGE OF SCHOOLCHILDREN—Iona and Peter Opie—*Oxford Univ. Press*, 417 p., maps, \$8. Based on information collected from 5,000 British schoolchildren, it records their primitive rhymes and chants, rites, superstitious beliefs, and seasonal customs.

THE MEANING OF DEATH—Herman Feifel, Ed.—*McGraw*, 351 p., \$6.50. Contributors encompass fields of anthropology, medicine, physiology, psychology and philosophy.

MEDICINE AND SOCIETY IN AMERICA, 1660-1860—Richard Harrison Shryock—*N. Y. Univ. Press*, 182 p., \$4. Brief interpretation of medical developments during this country's first two centuries.

MICROORGANISMS AND SOIL FERTILITY—Walter Beno Bollen—*Ore. State College*, 24 p., paper, \$1. Monograph on the function of soil microorganisms in relation to the crop-producing power of the soil.

MOVING ENVELOPES OF STARS—V. V. Sobolev, transl. from Russian by Sergei Gaposchkin—*Harvard Univ. Press*, 106 p., \$4.75. Detailed study of phenomena occurring in the ejected envelopes of stars and planetary nebulae.

PAPER: The Fifth Wonder—John H. Ainsworth—*Thomas Printing & Pub. Co.*, 2nd rev. ed., 352 p., illus., \$5. The story of paper making and its uses.

PEOPLE UNDER PRESSURE—Albert M. Barrett—*Twayne*, 99 p., \$3. Discusses various types of tensions.

PHYSICS IN YOUR HIGH SCHOOL: A Handbook for the Improvement of Physics Courses—American Institute of Physics—*McGraw*, 136 p., paper, \$1.50. Directed primarily to school board members.

PLANT GROWTH SUBSTANCES—L. J. Audus—*Interscience*, 2nd ed., 553 p., illus., \$10. Revised and expanded to include the more important advances. Lists sensitivities of weed, crop and plants to treatment with hormone herbicides. 63-page bibliography included.

THE POISONS IN YOUR FOOD—William Longood—*Simon & Schuster*, 277 p., \$3.95. Journalist presents case of the possible dangers to our health from the ever increasing use of food additives.

PRINCIPLES OF COMPARATIVE PSYCHOLOGY—Rolland H. Waters, D. A. Rethlingshafer and Willard E. Caldwell, Eds.—*McGraw*, 453 p., illus., \$7.95. Presents data and interpretations of original research in field of animal study.

PRINCIPLES OF PALEOBOTANY—William C. Darrah—*Ronald*, 2nd ed., 295 p., illus., \$6.50. Introductory survey of the field of paleobotany for the nonspecialist, brought up to date.

RECOMMENDED PROCEDURES FOR THE IDENTIFICATION OF SELECTED PATHOGENIC MICROORGANISMS—Joshua M. Leise and others—*U. S. Army Chemical Corps (OTS)*, 2nd ed., 105 p., paper, \$2.50. Bacteria, fungi, and antibiotic susceptibility determinations.

THE RELUCTANT SURGEON: A Biography of John Hunter—John Kobler—*Doubleday*, 359 p., \$4.95. The life and times of the 18th century London scientist who revolutionized surgery.

SCIENCE AND LIBERAL EDUCATION—Bentley Glass—*La. State Univ. Press*, 115 p., \$3. Essays on the relationship of scientific progress to the development of power and human goals.

SEAMANSHIP SIMPLIFIED—Elbert Robberson—*Ziff-Davis*, 246 p., illus., \$4.95. Step-by-step description of all phases of boating.

SECRETS OF THE CUNA EARTHMOTHER: A Comparative Study of Ancient Religions—Clyde E. Keeler—*Exposition*, 352 p., illus., \$6. Detailed study of the rituals of the Cuna Indian tribe on the isthmus of Panama.

THE SENSE OF SMELL—Roy Bedichek—*Doubleday*, 264 p., \$3.95. Naturalist talks about the human nose and the olfactory sense in mammals, insects and birds.

SPACE WORLD, Vol. I, No. 1—Otto O. Binder, Ed.—*Spaceways*, 66 p., illus., paper, 50¢; bi-monthly, \$2.75 annually. News magazine devoted to comprehensive and critical coverage of developments in space science.

THE STORY OF A TLINGIT COMMUNITY: A Problem in the Relationship between Archaeological, Ethnological, and Historical Methods—Frederica de Laguna—*Smithsonian Inst. (GPO)*, 254 p., illus., \$2.

SUCCESSFUL ROSE GROWING—A. Norman, foreword by A. G. L. Hellyer—*Collingridge (Transatlantic)*, 2nd ed., 183 p., photographs, \$4.50. Written by British authority on roses.

THE THEORY OF OPTIMUM NOISE IMMUNITY—V. A. Kotelnikov, transl. from Russian by R. A. Silverman—*McGraw*, 140 p., \$7.50. Analyzes the effects of additive gaussian noise on communication systems, and suggests how to minimize them.

THERMOCHEMISTRY FOR STEELMAKING, Vol. I—John F. Elliott and Molly Gleiser—*Addison-Wesley*, 296 p., \$10.50. Information on pertinent chemical properties and some physical properties of elements and compounds.

THERMODYNAMIC PRINCIPLES FOR CHEMICAL ENGINEERS—Roger Gilmont—*Prentice-Hall*, 339 p., illus., \$11. Exposition of thermodynamic fundamentals as applied to chemical systems.

THERMODYNAMICS: An Introduction to the Physical Theories of Equilibrium Thermodynamics and Irreversible Thermodynamics—Herbert B. Callen—*Wiley*, 376 p., illus., \$8.75. Uses postulational approach.

UNDERSTANDING CHEMISTRY—Lawrence P. Lessing—*Interscience*, 192 p., illus., \$3.50. Summary of chemistry's basic laws and their application in everyday uses.

WHY SMASH ATOMS?—A. K. Solomon—*Penguin*, rev. ed., 173 p., photographs, illus. by K. C. Barieau, 95¢. Represents the atmosphere of experimental nuclear physics in 1940.

Science News Letter, March 5, 1960

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ASTRONOMY

Van Allen Says Belts Kill Solar Batteries

THE EARTH'S radiation belts will destroy solar batteries used to power instruments in satellites, Dr. James A. Van Allen, the discoverer of the belts, reported.

The batteries, which convert sunlight into electricity, would probably last only a few days or weeks in a satellite that orbited continuously within the outer radiation belt, Dr. Van Allen told a banquet sponsored by the D. C. Council of Engineering and Architectural Societies and the Washington Academy of Sciences, Washington, D. C.

The radiation will also make manned space stations in the belts impossible for many years. The tons of shielding required is too great to be practical now, Dr. Van Allen said. Man, however, can pass through the belts safely or remain in them for short times with relatively thin shielding.

The radiation apparently kills solar batteries in two ways: It changes the vital structure of the semi-conductors that are the heart of the battery and it blackens the quartz windows that are designed to let the sun's light in.

Dr. Van Allen, a key figure in America's space work, is the head of the State University of Iowa physics department. He described the Van Allen belts (named for him) as "halos" of charged particles.

Science News Letter, March 5, 1960

Questions

GEOLOGY—In which two ways are icebergs formed, or "born"? p. 154.

MEDICINE—What are some of the dangers in the use of tranquilizers? p. 148.

ROENTGENOLOGY—Why is the improved procedure for X-rays of the heart of special importance to very young cardiac patients? p. 150.

Photographs: Cover, Massachusetts Institute of Technology; p. 147, British Information Services; p. 149, A. Scholes; p. 151, United Air Lines; p. 154, U. S. Coast Guard; p. 160, Eastman Chemical Products, Inc.

Do You Know

Nearly 2,000,000 individual fires in the U.S. in 1958 caused destruction of property valued at \$1.25 billion.

Estimated U.S. production of crude petroleum in 1959 was 2,571 million barrels, a five percent gain over 1958.

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With this equipment and materials commonly found around the household, such as sugar, a potato and vinegar, the unit outlines ten experiments for demonstrating the different characteristics of the plants and the various conditions under which they grow. It also gives their classification, shows how they fit into the plant kingdom and describes their different methods of reproduction.

The bacteriology unit (No. 231), prepared with the cooperation of Eli Lilly and Company, is available for 75¢ each or three for \$1.50 by writing to THINGS of science, Science Service, 1719 N St., N.W., Washington 6, D. C. Membership in THINGS of science is available at \$5.00 for 12 monthly units.

Science News Letter, March 5, 1960

CHEMISTRY

Known Process May Supply Space Oxygen

FUTURE SPACE travelers may get their oxygen from a chemical process known for many years.

The process is the reduction of carbon dioxide with hydrogen and recovery of breathable oxygen by electrolysis of water, the American Institute of Chemical Engineers meeting was told at Atlanta, Ga.

Dr. John F. Foster of Battelle Memorial Institute, Columbus, Ohio, said the process "appears to be substantially superior to other processes considered." The apparatus involved has "potentially a low weight, great reliability, and good efficiency with low power and energy consumption."

Dr. Foster pointed out that space vehicles probably will make trips of several years duration and will not be able to carry an adequate supply of oxygen.

Reduction of carbon dioxide by hydrogen, he said, is a well known reaction that has been used by the gas industry to produce fuel gas.

Science News Letter, March 5, 1960

Dive Depth Corrected

Precise calibration of the depth gauges aboard the bathyscap Trieste shows that the actual depth reached on its record dive in the Marianas Trench off Guam on Jan. 23 was 35,800 feet, or 2,000 feet less than first reported, the U.S. Navy has announced. See SNL, 77:91, 1960.

Science News Letter, March 5, 1960

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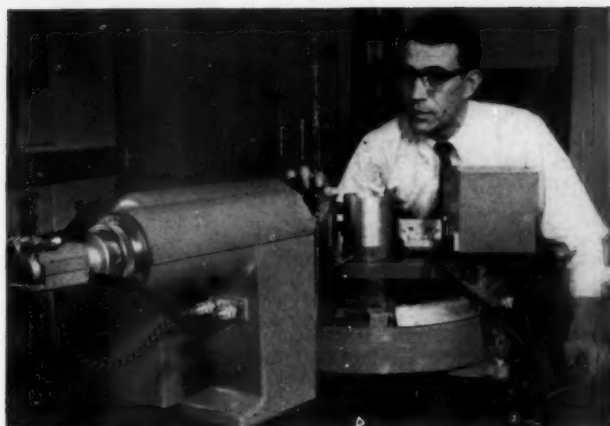
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HE X-RAYS WOOD...

to help make
telephone poles
last longer



Chemist Jack Wright developed the use of this X-ray fluorescence machine for testing the concentration of preservatives in wood. Here he bombards a boring from a test telephone pole with X-rays.

This Bell Labs chemist is using a fast, new technique for measuring the concentration of fungus-killing preservative in telephone poles.

A boring from a test pole is bombarded with X-rays. The preservative—pentachlorophenol—converts some of the incoming X-rays to new ones of different and characteristic wave length. These new rays are isolated and sent into a radiation counter which registers their intensity. The intensity in turn reveals the concentration of preservative.

Bell Laboratories chemists must test thousands of wood specimens annually in their research to make telephone poles last longer. Seeking a faster test, they explored the possibility of X-ray fluorescence—a technique developed originally for metallurgy. For the first time, this technique was applied to wood. Result: A wood specimen check in just two minutes—at least 15 times faster than before possible with the conventional microchemical analysis.

Bell Labs scientists must remain alert to *all* ways of improving telephone service. They must create radically new technology or improve what already exists. Here, they devised a way to speed research in one of telephony's oldest and most important arts—that of wood preservation.

Nature still grows the best telephone poles. There are over 21 million wooden poles in the Bell System. They require no painting, scraping or cleaning; can be nailed, drilled, cut, sawed and climbed like no other material. Scientific wood preservation cuts telephone costs, conserves valuable timber acres.



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THERMOMETER TIE CLASP has a circular thermometer with an easily read dial and non-breakable crystal. Calibrated from minus 20 degrees to 120 degrees Fahrenheit, it is sensitive to within one degree. The same thermometer is also available in cuff links.

Science News Letter, March 5, 1960

MEMO PAD is actually four pads in one, all contained in a long, slim book folder with padded cover in a choice of eight colors. Inside are smaller pads for memos, appointments, things to do, and phone calls.

Science News Letter, March 5, 1960

TAMPER-PROOF LOCK is claimed to foil the best efforts of the most prankish youngster to impair its proper functioning. It has concealed screws protected by the lockset trim. Available in a variety of designs in all standard finishes, the lock is particularly designed to meet the specialized requirements of schools.

Science News Letter, March 5, 1960

TOY SPACE HELMET, shown in the photograph, of acetate plastic is equipped with a radio that will receive several stations. A separate inside headband holds twin crystal earphones in place. The radio itself rests in a pocket on an accompanying



flying belt. A telescoping antenna that extends up to 60 inches sprouts from the top of the helmet.

Science News Letter, March 5, 1960

TOOTHPASTE DISPENSER allows the user to put as little or as much toothpaste on a brush as he desires without having to

touch the tube. It can be installed on wood, plaster or ceramic tile walls and is available in six colors. The dispenser may also be used for shaving cream, hand cream, hair cream or ointment.

Science News Letter, March 5, 1960

BRIDGE TALLIES, for regular or progressive bridge, have recipes for tasty party treats on their backs. They are 2½ by 4 inches. The tallies, which come in sets of eight with two score cards, are printed in a variety of bold colors and smart designs.

Science News Letter, March 5, 1960

AIR SAMPLER is battery-operated and portable and contains an air pump, a flowmeter, a filter holder and a battery charger in a durable shoulder bag. The sampler allows engineers to take dust or gas samples in the field where no power lines are available.

Science News Letter, March 5, 1960

ELECTRICITY TESTER to see if an outlet is "live" tests all A.C. and D.C. voltages from 110 to 500 volts. It may be used to check auto spark plugs and ignition coils, and as a safety tester for short circuits of electrical appliances, radios and television receivers.

Science News Letter, March 5, 1960



Nature Ramblings



By HORACE LOFTIN

THE WHOLE business began innocently enough. A garden-loving Australian thought the American prickly pear with its beautiful blooms would make a nice ornamental for his rather dry place in the country. So he imported a few and set them out. The prickly pears did well in that semi-arid Australian soil. Too well. For in a matter of time, the prickly pear had invaded the grazing land of vast areas of Australia, leaving thousands of acres unfit for livestock or any other use.

In desperation, the Australians used fire, plowing, chemicals and other means of control, but nothing seemed to stop the march of this cactus. Then someone asked a pointed question: why does the prickly pear not overrun everything in its native home, the southwestern United States? The answer was soon forthcoming. Insect enemies, especially a cactus moth, keep the prickly pear in check on its home ground.

This moth was introduced into the in-

Hide and Seek



festated Australian region and it found itself in a cactus moth's paradise. Laying its eggs in the succulent prickly pear leaves where the emerging young could feed voraciously, the moth spread even faster than the cactus had spread. And where it went, the cactus disappeared.

Today, most of these acres of infested land have been cleared of the prickly pear. But once in a while a patch of cactus will pop up in one spot. Then where moths were not seen before, the cactus moth appears suddenly to strike at this prickly pear, killing it off.

The continued existence of both the prickly pear and the cactus moth in Australia depends on this game of "hide and seek." Enough cactus seed are spread so that a few plants may grow up and produce seed before the moths can find them. By the time the moths get to them, their seed have been spread elsewhere. Thus, a sort of natural balance between the numbers of prickly pears and moths has been struck. You might say that these two immigrants have settled down into respectable naturalized Australians now.

The introduction of a pest, followed by an insect to control it, has worked the other way, too: from Australia into the United States. A highly destructive scale insect of citrus found its way from Australia to California about the end of the last century. An American went to Australia, found the natural enemy of this scale, brought it back and literally saved the citrus industry. This Australian lady beetle earned its naturalization papers!

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